

TWO NEW RECORD SUBGENERA OF *ORTHOCLADIUS* (DIPTERA, CHIRONOMIDAE) FROM CHINA

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Abstract Two new record subgenera *Orthocladius* (*Pogonocladius*) and *O.* (*Symposiocladius*) from China are reviewed. One new species, *O.* (*S.*) *futianensis* sp. nov. is described and illustrated, and *O.* (*P.*) *consobrinus* (Holmgren), *O.* (*S.*) *holsatus* Goetghebuer, *O.* (*S.*) *lignicola* Kieffer, *O.* (*S.*) *schneelli* Sæther are recorded from China for the first time. A key to the Chinese of the subgenus *Symposiocladius* is presented.

Key words Diptera, Chironomidae, *Orthocladius*, *Pogonocladius*, *Symposiocladius*, new subgenera, new record, China.

1 Introduction

The genus *Orthocladius* van der Wulp, 1874 is widespread in Holarctic Region, and includes over 100 species (Rossaro & Prato, 1991). According to Sæther (2005), *Orthocladius* is presently divided into six subgenera, *Eudactylocadius* Thienemann, *Euorthocladius* Thienemann, *Pogonocladius* Brundin, *Symposiocladius* Cranston, *Mesorthocladius* Sæther and *Orthocladius* s. str.

O. (*Pogonocladius*) was erected by Brundin (1956) based on the only species *O.* (*P.*) *consobrinus* (Holmgren). Pinder & Cranston (1976) gave a detailed description of this species. The subgenus is unique in having anal point pointed but not robust, virga present, superior volsella reduced or collar-like, dorsal part of inferior volsella narrow and long.

Cranston (1983) erected the genus *Symposiocladius* for *Orthocladius lignicola* Kieffer primarily based upon the characteristic immature stages with the larva mining submerged wood. However, as the imagines of *O. lignicola* do not differ significantly from several species of *Orthocladius* s. str., Cranston and Oliver (1988) and Cranston *et al.* (1989) regarded *Symposiocladius* merely as a subgenus of *Orthocladius*. The male imagines can be separated from other *Orthocladius* by the combination of no virga, anal point triangular with pointed apex, collar-like superior volsella, and inferior volsella with ventral part not extended prominently below dorsal part. To date, eight species of the subgenus have been recorded worldwide, of which one is Holarctic, five are Palearctic and two are Nearctic (Sæther 2003).

Both *O.* (*Pogonocladius*) and *O.* (*Symposiocladius*) are new to China. *O.* (*P.*) *consobrinus* (Holmgren) and four species of *O.* (*Symposiocladius*) are recorded in China below.

2 Materials and Methods

The morphological nomenclature follows Sæther (1980). The material examined was mounted on slides following the procedure outlined by Sæther (1969). Measurements are given as ranges followed by the arithmetic mean, when four or more measurements, followed by the number of specimens (n) measured in parentheses. In the figures of the male genitalia the dorsal aspect is shown to the left, the ventral aspect and apodemes to the right. All types are deposited in the College of Life Sciences, Nankai University, China (BDN).

3 Species Description

3.1 *Orthocladius* (*Pogonocladius*) *consobrinus* (Holmgren) New record to China

Chironomus consobrinus Holmgren, 1869: 44; Edwards, 1922: 206.

Orthocladius crassicornis Goetghebuer, 1937: 508.

Orthocladius (*Pogonocladius*) *consobrinus* Pinder & Cranston, 1976: 19; Oliver *et al.*, 1990: 32; Makarchenko & Makarchenko, 2011: 115.

Material examined. 5 males, Qinghai Province, Menyuan County, Fenglikou Meadow, 18 July 1989, sweep net, WEI Mei-Cai.

Diagnosis. This species is unique in the dorsal part of inferior volsella long and narrow, superior volsella reduced or collar-like.

Remarks. This species has been described in detail by Pinder & Cranston (1976). Specimens from China are well in accordance with the original description.

Distribution. The species has been recorded from Palearctic and Nearctic Regions, and it occurs in Qinghai Province in Palearctic China.

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3.2 *Orthocladus* (*Symposiocladius*) *futianensis* sp. nov. (Figs 1-3)

Male ($n = 3$). Total length 3.90 - 4.30 mm. Wing length 2.18 - 2.38 mm. Total length / wing length 1.79 - 1.81. Wing length / length of profemur 2.39 - 2.50.

Coloration. Head and thorax brown. Antenna, legs and abdomen yellowish brown.

Head. AR 1.18 - 1.40. Ultimate flagellomere 600 - 650 μm long. Temporal setae 9 - 12, including 2 - 3 inner verticals, 3 - 5 outer verticals and 4 postorbitals. Clypeus with 6 - 7 setae. Cibarial pump, tentorium and stipes as in Fig. 1. Tentorium 132 - 176 μm long, 30 - 44 μm wide. Stipes 168 - 188 μm long, 59 - 63 μm wide. Palpomere lengths (in μm): 26 - 40, 40 - 53, 92 - 114, 88 - 110, 154 - 198. Length ratio of palpomeres 5/3 1.67 - 1.74.

Wing (Fig. 2). Anal lobe moderately developed. VR 1.16 - 1.19. Costal extension 30 - 40 μm long. R with 9 - 12 setae, other veins bare. Squamma with 11 - 15 setae.

Thorax. Anteprenotum with 4 setae. Dorsocentrals 9 - 13, acrostichals 10 - 15, prealars 3 - 4. Scutellum with 7 - 11 setae.

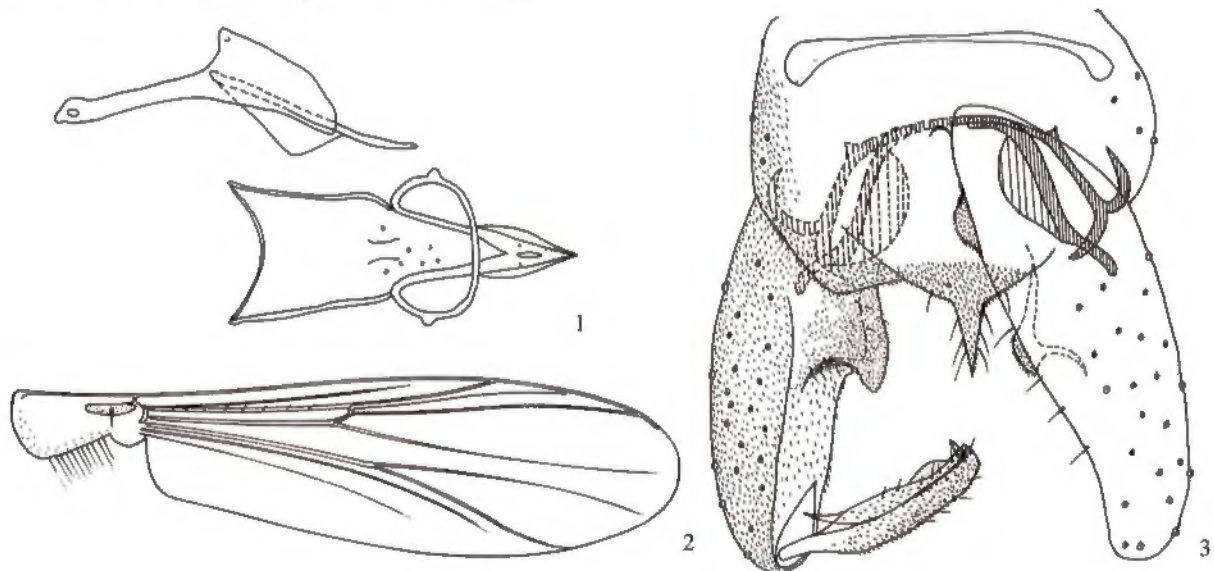
Legs. Spur of fore tibia 57 - 66 μm , spurs of mid tibia 26 - 35 μm and 25 - 26 μm long, of hind tibia 66 - 75 μm and 22 - 26 μm long. Comb of 10 - 14 setae, shortest seta 29 - 30 μm , longest seta 51 - 66 μm .

Width at apex of fore tibia 34 - 48 μm , of mid tibia 48 - 62 μm , of hind tibia 44 - 49 μm . Pseudospurs present on ta_1 and ta_2 of mid and hind leg, 18 - 26 μm long. Sensilla chaeticae absent. Lengths (in μm) and proportions of legs in the table below.

Table 1. Lengths (in μm) and proportions of legs segments of male *O. (S.) futianensis* sp. nov.

	P ₁	P ₂	P ₃
fc	950 - 1 010	1 010 - 1 060	1 060 - 1 110
ti	1 160 - 1 230	990 - 1 070	1 180 - 1 290
ta ₁	790 - 860	500 - 510	720 - 740
ta ₂	520 - 540	320 - 330	410 - 430
ta ₃	390 - 410	230 - 240	330 - 340
ta ₄	280 - 290	160	180 - 210
ta ₅	140 - 150	120 - 140	145 - 160
LR	0.68 - 0.70	0.48 - 0.51	0.57 - 0.61
BV	2.13 - 2.28	3.01 - 3.03	2.72 - 2.78
SV	2.60 - 2.67	4.00 - 4.18	3.11 - 3.24
BR	2.20 - 3.00	2.25 - 3.00	3.80 - 4.17

Hypopygium (Fig. 3). Tergite IX including anal point with 10 - 14 setae. Laterosternite IX with 6 - 8 setae. Anal point 35 - 42 μm long, 12 - 22 μm wide. Phallapodeme 95 - 120 μm long; transverse sternapodeme 112 - 138 μm long, oral projections well developed. Gonocoxite 250 - 255 μm long. Gonostylus widest nearly medially, 128 - 130 μm long; crista dorsalis nearly apically. Megasta 13 - 17 μm long. HR 1.92 - 2.00, HV 3.31 - 3.67.



Figs 1 - 3. *Orthocladus* (*Symposiocladius*) *futianensis* sp. nov. 1. Tentorium, stipes and cibarial pump. 2. Wing. 3. Hypopygium.

Holotype male, China, Yunnan Province, Eryuan County, Niujie Town, Futian Village, 23 May 1996, light trap, ZHOU Chang-Fa (BDN No. 10099). Paratypes 2 males, same data as holotype.

Diagnosis. The species can be separated from other members of the subgenus by having gonostylus

widest nearly medially, and crista dorsalis present apically.

Etymology. Named after the type locality.

Distribution. The specimens were collected in Yunnan Province in Oriental China.

3.3 *Orthocladius* (*Symposiocladius*) *holsatus* Goetghebuer New record to China

Orthocladius holsatus Goetghebuer, 1937: 509.

Orthocladius holsatus Goetghebuer; Langton, 1991: 190; Langton & Cranston, 1991: 246; Sæther, 2003: 307.

Material examined. 1 male, Fujian Province, Wuyishan Natural Reserve Area, Guadang, 29 Apr. 1993, light trap, BU Wen-Jun; 1 male, Fujian Province, Wuyishan Natural Reserve Area, Sangang, 25 Apr. 1993, light trap, BU Wen-Jun.

Diagnostic. The species can be separated from other members of the subgenus by having gonostylus widest near apex, crista dorsalis low and elongate, and phallapodeme nearly straight apically.

Remarks. Sæther (2003) recorded the species from Norway, thorax with 7–14 anteprenotals, 11–18 dorsocentrals, 5–7 prealars, while the Chinese specimen thorax with 8–9 anteprenotals, 9 dorsocentrals, 3–4 prealars.

Distribution. The species is widespread in Europe. It occurs in Fujian Province in Oriental China.

3.4 *Orthocladius* (*Symposiocladius*) *lignicola* Kieffer New record to China

Orthocladius lignicola Kieffer in Potthast, 1915: 273.

Symposiocladius lignicola (Kieffer) Cranston, 1983: 419; Cranston et al., 1983: 199; Coffman et al., 1986: 209; Langton, 1991: 182.

Orthocladius (*Orthocladius*) *tryoni* Sponis, 1977: 100.

Orthocladius (*Symposiocladius*) *lignicola* Kieffer, Cranston et al., 1989: 147; Sæther, 2003: 298; Makarchenko & Makarchenko, 2011: 115.

Material examined. 2 males, Zhejiang Province, Tianmushan Natural Reserve Area, 12 Nov. 1998, light trap, WANG Xin-Hua.

Diagnosis. The species can be separated from other members of the subgenus by having long and narrow palpomeres with third palpomere about 1.5 times as long as fourth palpomere, 6–17 dorsocentrals, R with 6–13 setae and gonostylus without inner projection and widest in the middle.

Remarks. The male is well described by Cranston (1983) and Sponis (1977, as *O. (O.) tryoni*). Specimen from China has AR 1.93–2.12, LR₁ 0.78–0.80, both are higher than specimen from Nearctic Region (AR 1.73 and LR₁ 0.68).

Distribution. The species has been recorded from Palaearctic and Nearctic Regions. It occurs in Zhejiang Province in Oriental China.

3.5 *Orthocladius* (*Symposiocladius*) *schelli* Sæther New record to China

Orthocladius (*Symposiocladius*) *annectens*, Schnell, 1988: 2, in list, not *O. annectens* Sæther.

Orthocladius (*Symposiocladius*) *schelli* Sæther, 2003: 303; Makarchenko & Makarchenko, 2011: 115.

Material examined. 1 male, Fujian Province, Wuyishan Natural Reserve Area, Mt. Xianfeng, 30 Apr. 1993, light trap, BU Wen-Jun.

Diagnosis. This species can be separated from

other members of the subgenus by having gonostylus widest near apex and often club-shaped or with outer corner.

Remarks. This species has been described in detail by Sæther (2003), while two variations can be seen between Norwegian and Chinese specimens. Specimen from Norway with vein R with 2–6 setae and LR₁ 0.61–0.65, in contrast with Chinese specimen R with 10 setae and LR₁ 0.74.

Distribution. This species has been recorded from Norway (Schnell, 1988; Sæther, 2003). It occurs in Fujian Province in Oriental China.

Key to adult males of *Orthocladius* subgenus *Symposiocladius* in China.

1. Gonostylus widest medially 2
Gonostylus widest near apex 3
2. Phallapodeme nearly straight apically, thorax with 7–14 anteprenotals *O. (S.) holsatus* Goetghebuer
Phallapodeme not straight apically, thorax with 1–5 anteprenotals *O. (S.) schelli* Sæther
3. Palpomeres long and narrow, third palpomere about 1.5 times as long as fourth palpomere, crista dorsalis long and low *O. (S.) lignicola* Kieffer
Palpomeres not long or narrow, third palpomere nearly as long as fourth palpomere, crista dorsalis distinct *O. (S.) futianensis* sp. nov.

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REFERENCES

- Brundin, L. 1956. Zur Systematik der Orthoclaudiinae (Dipt., Chironomidae). *Report Institute Freshwater Research Drottningholm*, 37: 5–185.
- Coffman, W. P., Cranston, P. S., Oliver, D. R. and Sæther, O. A. 1986. The pupae of Orthoclaudiinae (Diptera: Chironomidae) of the Holarctic Region—Keys and diagnoses. In: Wiederholm, T. (ed.), *Chironomidae of the Holarctic Region. Part 2. Pupae. Entomologica Scandinavica*, 28 (Suppl.): 147–296.
- Cranston, P. S. 1983. The metamorphosis of *Symposiocladius lignicola* (Kieffer) nov. gen., nov. comb., a wood-mining Chironomidae (Diptera). *Entomologica Scandinavica*, 13: 419–429.
- Cranston, P. S. and Oliver, D. R. 1988. Aquatic xylophagous Orthoclaudiinae: a systematics and ecology. *Spixiana*, 14 (Suppl.): 143–154.
- Cranston, P. S., Oliver, D. R. and Sæther, O. A. 1983. The larvae of Orthoclaudiinae (Diptera: Chironomidae) of the Holarctic Region. Keys and diagnoses. In: Wiederholm, T. (ed.), *Chironomidae of the Holarctic Region. Part 1. Larvae. Entomologica Scandinavica*, 19 (Suppl.): 149–291.
- Cranston, P. S., Oliver, D. R. and Sæther, O. A. 1989. The adult males of Orthoclaudiinae (Diptera: Chironomidae) of the Holarctic Region. Keys and diagnoses. In: Wiederholm, T. (ed.), *Chironomidae of the Holarctic Region. Keys and diagnoses. Part 3. Adult males. Entomologica Scandinavica*, 34 (Suppl.): 165–352.
- Edwards, F. W. 1922. Results of the Oxford University Expedition to Spitsbergen, 1921. No. 14. Diptera Nematocera. *Ann. Mag. Nat. Hist. Ser.*, 10: 193–215.
- Goetghebuer, M. 1937. Quatre chironomides nouveaux d'Allemagne. *Arch. Hydrobiol.*, 31: 508–510.
- Holmgren, A. E. 1869. Bidrag til Kännedomen om Beeren Eilands och Spitsbergens Insekt-Fauna. (Contribution to the knowledge of Bear Island and Spitsbergen insect fauna.). *K. Svenska Vetensk. Akad.*

- Handl., 8: 1–56.
- Langton, P. H. 1991. A key to pupal exuviae of West Palaearctic Chironomidae. Private publication, Huntingdon, Cambridgeshire. 386 pp.
- Langton, P. H. and Cranston, P. S. 1991. Pupae in nomenclature and identification: West Palaearctic *Orthocladius* s. str. (Diptera: Chironomidae) revised. *Systematic Entomology*, 16: 239–252.
- Makarchenko, E. A. and Makarchenko, M. A. 2011. Fauna and distribution of the Orthoclaudiinae of the Russian Far East. In: Wang, X and Liu, W (eds.), Proceedings of the 17th International Symposium on Chironomidae. pp. 107–125.
- Oliver, D. R., Dillon, M. E. and Cranston, P. S. 1990. A Catalog of Nearctic Diptera. Research Branch Agriculture Canada Publication. 1857/B, 89 pp.
- Pinder, L. C. V. and Cranston, P. S. 1976. Morphology of the male imagines of *Orthocladius* (*Pogonocladus*) *consobrinus* and *O. glabripennis* with observations on the taxonomic status of *O. glabripennis* (Diptera: Chironomidae). *Entomologica Scandinavica*, 7: 19–23.
- Rossaro, B. and Prato, S. 1991. Description of six new species of the genus *Orthocladius* (Diptera, Chironomidae). *Fragm. Ent.*, 23: 59–68.
- Sæther, O. A. 1969. Some Nearctic Podonominae, Diamesinae, and Orthoclaudiinae (Diptera: Chironomidae). *Bulletin of the Fisheries Research Board of Canada*, 170: 1–154.
- Sæther, O. A. 1980. Glossary of chironomid morphology terminology (Diptera: Chironomidae). *Entomologica Scandinavica*, 14 (Suppl.): 51 pp.
- Sæther, O. A. 2003. A review of *Orthocladius* subgen. *Symposiocladius* Cranston (Diptera: Chironomidae). *Aquatic Insects*, 25 (4): 281–317.
- Sæther, O. A. 2005. A new subgenus and new species of *Orthocladius* van der Wulp, with a phylogenetic evaluation of the validity of the subgenera of the genus (Diptera: Chironomidae). *Zootaxa*, 974, 1–56.
- Schnell, Ø. A. 1988. Twentyeight Chironomidae (Diptera) new to Norway. *Fauna Norvegica*, Series B, 35: 1–4.
- Soponis, A. R. 1977. A revision of the Nearctic species of *Orthocladius* (*Orthocladius*) van der Wulp (Diptera: Chironomidae). *Memoirs of the Entomological Society of Canada*, 102: 1–187.
- Wulp, F. M. van der. 1874. Dipterologische aantekeningen. *Tijdschrift voor Entomologie*, 17: 109–148.

中国直突摇蚊属两新纪录亚属记述 (双翅目, 摇蚊科)

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摘 要 记述中国直突摇蚊属两个新纪录亚属, 寄莼直突摇蚊亚属 *Orthocladius* (*Pogonocladus*) 和钻木直突摇蚊亚属 *Orthocladius* (*Symposiocladius*), 雄成虫共 5 种, 包括 1 新种 *O.* (*S.*) *futianensis* sp. nov., 中国 4 新纪录种 *O.* (*P.*) *consobrinus* (Holmgren), *O.* (*S.*) *holsatus* Goetghebuer, *O.* (*S.*) *lignicola* Kieffer 和 *O.* (*S.*) *schmelli* Sæther, 并编制了中国钻木直突摇蚊亚属 4 种雄虫检索表。新种模式标本均保存于南开大学生命科学学院摇蚊学研究室。

关键词 摇蚊科, 直突摇蚊属, 寄莼直突摇蚊亚属, 钻木直突摇蚊亚属, 新纪录, 检索表, 中国。
中图分类号 Q969.442.6

福田钻木直突摇蚊, 新种 *O.* (*S.*) *futianensis* sp. nov. (图 1~3)

雄成虫与本亚属其它已知种的区别如下: 抱器端节中部最宽, 亚端背脊突出, 位于抱器端节的近末端。

正模 ♂, 云南省洱源县牛街镇福田村, 1996-05-23, 灯诱, 周长发采。副模 2 ♂♂, 同正模。

词源: 新种种名源自其模式产地。

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